



Information technology in a global society subject outline

First examinations 2012

This document explains the major features of the course, and outlines the syllabus and assessment requirements.

More detailed information about the course can be obtained by referring to the guide for this subject, which is available on the subject page of the IB online curriculum centre (OCC) website (<http://occ.ibo.org>) and can also be purchased from the IB store (<http://store.ibo.org>).

Nature of the subject

Students of group 3 subjects study individuals and societies. This means that they explore the interactions between humans and their environment in time and place. As a result, these subjects are often known collectively as the human sciences or social sciences.

The IB Diploma Programme information technology in a global society (ITGS) course is the study and evaluation of the impacts of information technology (IT) on individuals and society. It explores the advantages and disadvantages of the access and use of digitized information at the local and global level. ITGS provides a framework for the student to make informed judgments and decisions about the use of IT within social contexts.

Although ITGS shares methods of critical investigation and analysis with other social sciences, it also considers social and ethical considerations that are common to other subjects in group 3. Students come into contact with IT on a daily basis because it is so pervasive in the world in which we live. This increasingly widespread use of IT inevitably raises important questions with regard to the social and ethical considerations that shape our society today. ITGS offers an opportunity for a systematic study of these considerations, whose range is such that they fall outside the scope of any other single discipline.

The nature of the subject is defined by the use of fundamental ITGS terms. For the purpose of the ITGS syllabus the following definitions apply.

- *Information technology (IT)* is the study, design, development, implementation, support or maintenance of computer-based information systems.
- *Social and ethical significance* refers to the effects that the development, implementation and use of information technology has on individuals and societies. Social impacts and ethical considerations are not mutually exclusive and are therefore categorized as a single entity. However, in general:
 - *social impacts* tend to refer to the effects of IT on human life
 - *ethical considerations* tend to refer to the responsibility and accountability involved in the design and implementation of IT.
- An *information system* is a collection of people, information technologies, data, processes and policies organized to accomplish specific functions and solve specific problems.

ITGS has links with subjects not included in group 3, notably computer science, but it should be noted that there are clear differences between the subjects.

ITGS	Computer science
In ITGS, people are central to the study of the subject. This is underpinned by a secure knowledge of the technology within the specified IT system. This technical knowledge ensures that the discussion of the effects of a new IT system on people will not be superficial.	In computer science, the emphasis is on a detailed knowledge of the computer system, followed by an awareness of its effects on people.
ITGS considers the internal workings of an IT system only to the extent of how it contributes to the understanding of a social impact or ethical issue.	Computer science emphasizes a detailed understanding of the logic and internal workings of a system.

ITGS	Computer science
ITGS is concerned with the development of IT systems, with particular emphasis on the effects on clients and end-users.	Computer science is concerned with algorithmic thinking and the ways in which a real-world problem can be decomposed in order to construct a working computable solution.
ITGS looks to implement a new IT system based on the use of currently available software.	Computer science looks to develop a new system using existing building blocks or by creating a totally novel approach as appropriate. This may involve the writing of new code in an appropriate programming environment.
ITGS is concerned with activities such as choosing and using a spreadsheet, finding ways of using it more effectively, and educating other people about its use. It is concerned with the effects of using the software and obtaining reliable results that are beneficial to all who are affected by it.	Computer science examines real-world problems and produces algorithms from which useful software can be derived. The computer scientist creates the initial concepts and designs to produce appropriate and novel solutions to problems or by adapting existing solutions.

The main difference between ITGS and computer science relates to the focus of study. ITGS is about how people are affected by systems already in use and those planned for the future. Computer science looks first at the technology and then later at its interaction with those affected by it.

Some degree of overlap between the two subjects is intentional, inevitable and desirable.

Prior learning

No particular background in terms of specific subjects studied for national or international qualifications is expected or required, and no prior knowledge of ITGS is necessary for students to undertake this course. However, a familiarity with IT terminology, concepts and tools would be an advantage, as would be completing the humanities and technology courses in the IB Middle Years Programme (MYP).

Links to the Middle Years Programme

The MYP humanities course develops technical skills, analytical skills, decision-making skills and investigative skills, all of which are required in ITGS. In addition, an understanding of the key concepts of time, place and space, change, systems and global awareness prepares students for the demands of the ITGS course. This learning will help students to develop not only practical skills but also creative and critical-thinking strategies.

The MYP technology course develops skills linked to the design cycle, which provides the model of thinking and the strategy used to help students investigate problems and design, plan, create and evaluate the product. In order to successfully complete the IB Diploma Programme ITGS project, students are expected to create an IT solution to a specific problem using the product development life cycle, which extends the range of skills developed in MYP technology.

Middle Years Programme technology course	Diploma Programme ITGS course
Develop an appreciation of the significance of technology for life, society and the environment.	Develop the ability to evaluate the social, cultural and ethical considerations arising from widespread use of IT for individuals, families, communities and organizations.
Use and apply IT effectively as a means to access, process and communicate information, and to solve problems.	Develop an understanding of IT systems and the skills and knowledge to use them effectively.
Develop respect for others' viewpoints and appreciate alternative solutions to problems.	Compare the effectiveness of a range of possible solutions to a social and/or ethical consideration that has been identified in an IT context. In the case of the project, to justify the choice of the preferred solution used to resolve the inadequacies identified.
Use knowledge, skills and techniques to create products and solutions of the appropriate quality.	Effective use of an appropriate range of basic and complex IT tools during the study of ITGS and for the development of the ITGS project.
Develop problem-solving, critical and creative-thinking skills through the application of the design cycle.	Regularly consult with the client and obtain feedback about the product from the client using an appropriate method that indicates whether the product meets the client's requirements. Recommend proposals for the future improvement of the product.
Design cycle.	Product development life cycle (PDLC) and system development life cycle (SDLC).

As in the MYP technology course, a *product* can be defined as the solution that students have generated independently. This means that the Diploma Programme ITGS course requires students to become actively involved in, and to focus on, the whole design process rather than just on the final product, building on the skills acquired during the MYP technology course.

The IB technology continuum

The MYP technology course builds on experiences of inquiry that students have gained in their time in the IB Primary Years Programme (PYP). PYP teaching and learning experiences challenge students to be curious, ask questions, explore and interact with the environment physically, socially and intellectually to construct meaning and refine their understanding. Even when there is no technology component in the PYP, the use of structured inquiry is a precursor to the problem-solving and inquiry-based approach of MYP technology. Students continuing on to the IB Diploma Programme (DP) will have experienced the use of the design cycle and will have developed critical-thinking and design skills, which they will be able to apply and extend in ITGS.

Aims

Group 3 aims

The aims of all subjects in **group 3, individuals and societies** are to:

1. encourage the systematic and critical study of: human experience and behaviour; physical, economic and social environments; and the history and development of social and cultural institutions
2. develop in the student the capacity to identify, to analyse critically and to evaluate theories, concepts and arguments about the nature and activities of the individual and society
3. enable the student to collect, describe and analyse data used in studies of society, to test hypotheses, and to interpret complex data and source material
4. promote the appreciation of the way in which learning is relevant both to the culture in which the student lives, and the culture of other societies
5. develop an awareness in the student that human attitudes and beliefs are widely diverse and that the study of society requires an appreciation of such diversity
6. enable the student to recognize that the content and methodologies of the subjects in group 3 are contestable and that their study requires the toleration of uncertainty.

ITGS aims

In addition, the aims of the **information technology in a global society (ITGS)** course at SL and HL are to:

7. enable the student to evaluate social and ethical considerations arising from the widespread use of IT by individuals, families, communities, organizations and societies at the local and global level
8. develop the student's understanding of the capabilities of current and emerging IT systems and to evaluate their impact on a range of stakeholders
9. enable students to apply their knowledge of existing IT systems to various scenarios and to make informed judgments about the effects of IT developments on them
10. encourage students to use their knowledge of IT systems and practical IT skills to justify IT solutions for a specified client or end-user.

Assessment objectives

There are four assessment objectives for the SL and HL Diploma Programme ITGS course. Having followed the course at SL or HL, students will be expected to demonstrate the following.

Assessment objective 1: Knowledge and understanding of specified content

- Demonstrate an awareness of IT applications and developments in specified scenarios
- Demonstrate an awareness of the social and ethical significance of specified IT applications and developments
- Demonstrate technical knowledge of ITGS terminology, concepts and tools
- Demonstrate technical knowledge of IT systems
- Demonstrate knowledge and understanding of topics related to the annually issued case study (**HL paper 3 only**)

Assessment objective 2: Application and analysis

- Explain the impacts of IT applications and developments in specified scenarios
- Analyse the social and ethical significance of specified IT applications and developments
- Transfer IT knowledge and make connections between specific scenarios
- Apply technical knowledge of IT systems acquired through independent research to provide supporting evidence in possible decisions relating to future courses of action related to the annually issued case study (**HL paper 3 only**)

Assessment objective 3: Synthesis and evaluation

- Evaluate local and global impacts of specified IT developments through individually researched studies
- Evaluate a solution involving IT to a specified problem using knowledge of IT systems
- Discuss the social and ethical implications of specified IT policies and developments
- Evaluate, formulate and justify possible strategic courses of action related to the annually issued case study (**HL paper 3 only**)

Assessment objective 4: Use of ITGS skills

- Demonstrate evidence of project management in the development of a well-organized product to resolve a specific issue
- Use IT tools and the product development life cycle (PDLC) to create an original product in consultation with a client
- Demonstrate evidence of the use of appropriate techniques to develop an original IT product

Syllabus outline

At either level (SL or HL) the ITGS course consists of three compulsory interconnected strands that reflect the integrated nature of the course.

- **Strand 1:** Social and ethical significance
- **Strand 2:** Application to specified scenarios
- **Strand 3:** IT systems

Syllabus component	Suggested teaching hours	
	SL	HL
Strand 1: Social and ethical significance SL/HL core Social and ethical considerations linked to specified IT developments. Students must study the following 12 issues. <ol style="list-style-type: none"> 1.1 Reliability and integrity 1.2 Security 1.3 Privacy and anonymity 1.4 Intellectual property 1.5 Authenticity 1.6 The digital divide and equality of access 1.7 Surveillance 1.8 Globalization and cultural diversity 1.9 Policies 1.10 Standards and protocols 1.11 People and machines 1.12 Digital citizenship 	40	40
HL extension Social and ethical considerations linked to the two HL extension topics and the issues raised by the annually issued case study.	—	20

Syllabus component	Suggested teaching hours	
	SL	HL
Strand 2: Application to specified scenarios SL/HL core Scenarios based on real-life situations must be used when addressing specified IT developments. Students must study the following 6 themes. 2.1 Business and employment 2.2 Education and training 2.3 Environment 2.4 Health 2.5 Home and leisure 2.6 Politics and government HL extension Scenarios based on real-life situations must be used when addressing specified IT developments in the two HL extension topics and the annually issued case study.	40	40
Strand 3: IT systems SL/HL core The terminology, concepts and tools relating to specified IT developments. Students must study the following 9 topics. 3.1 Hardware 3.2 Software 3.3 Networks 3.4 Internet 3.5 Personal and public communications 3.6 Multimedia/digital media 3.7 Databases 3.8 Spreadsheets, modelling and simulations 3.9 Introduction to project management HL extension Students must study the following topics. 3.10 IT systems in organizations 3.11 Robotics, artificial intelligence and expert systems 3.12 Information systems specific to the annually issued case study	40	40
The project (practical application of IT skills) The application of skills and knowledge to develop an original IT product for a specified client.	30	30
Total teaching hours	150	240

Assessment outline—SL

First examinations 2012

Assessment component	Weighting
External assessment (3 hours) Paper 1 (1 hour 45 minutes) Five structured questions that assess in an integrated way the three strands of the syllabus. <ul style="list-style-type: none"> • Social and ethical significance • Application to specific scenarios • IT systems Students answer three of five structured questions on any of the SL/HL core topics. (60 marks)	70% 40%
Paper 2 (1 hour 15 minutes) This paper consists of one unseen article. Students are required to write a response to this article. (26 marks)	30%
Internal assessment This component is internally assessed by the teacher and externally moderated by the IB at the end of the course. Project (30 hours) The development of an original IT product for a specified client. Students must produce: <ul style="list-style-type: none"> • a cover page using prescribed format • an original IT product • documentation supporting the product (word limit 2,000 words). (30 marks)	30%

Assessment outline—HL

First examinations 2012

Assessment component	Weighting
External assessment (4 hours 45 minutes) Paper 1 (2 hours 15 minutes) Seven structured questions in three sections that assess in an integrated way the three strands of the syllabus. <ul style="list-style-type: none"> • Social and ethical significance • Application to specific scenarios • IT systems Section A Students answer two of three structured questions on any of the SL/HL core topics. Section B Students answer one of two structured questions based on topic 3.10, "IT systems in organizations". Section C Students answer one of two structured questions based on topic 3.11, "Robotics, artificial intelligence and expert systems". (80 marks)	80% 35%
Paper 2 (1 hour 15 minutes) This paper consists of one unseen article. Students are required to write a response to this article. (26 marks)	20%
Paper 3 (1 hour 15 minutes) Four questions based on a pre-seen case study. (30 marks)	25%
Internal assessment This component is internally assessed by the teacher and externally moderated by the IB at the end of the course. Project (30 hours) The development of an original IT product for a specified client. Students must produce: <ul style="list-style-type: none"> • a cover page using prescribed format • an original IT product • documentation supporting the product (word limit 2,000 words). (30 marks)	20%